

**Claims:**

1. A fork movement assembly for a lift truck having a mast and a pair of forks, each of said forks having a hook portion located on a shank portion thereof, said assembly comprising:

5 a) a carriage comprising a pair of horizontally spaced apart vertical members and a frame support member secured transversely to said vertical members, said vertical members being adapted to be movably secured within said mast;

10 b) a side shift frame comprising an upper cross member, a spaced apart lower cross member, and two side members connecting said upper cross member to said lower cross member, said upper cross member being slidably connected to said frame support member, said upper cross member being adapted to support said pair of forks at said hook portion, said upper cross member defining a front face, said lower cross member defining a  
15 sliding surface, said sliding surface being adapted to permit fork positioning wherein said shank portion of said forks is located no further forward than said front face of said upper cross member; and

20 c) a side shift operator means for causing movement of said side shift frame along said frame support member, said side shift operator means being located in a portion of said frame support member.

2. The assembly of claim 1, further comprising:

25 a) a first fork shoe and a second fork shoe adapted to slide along said sliding surface, each of said fork shoes being adapted to engage one of said pair of forks, each of said fork shoes defining a fork contact surface adapted to receive said shank portion, said fork contact surface being located no further forward than a front face of said upper cross member, and

b) a fork positioner adapted to move said first fork shoe relative to said second fork shoe, said fork positioner being operatively connected to said fork shoes.

30 3. The assembly of claim 2, wherein the frame has a rectangular shape.

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4. The assembly of claim 2, wherein each of said fork shoes defines a bottom edge, wherein at least a portion of said bottom edge of each of said fork shoes engages said sliding surface.
5. The assembly of claim 2, wherein said frame support member defines a convex upper contact surface and said upper cross member defines a lower concave contact surface, said convex upper contact surface being slidably received within a lower concave contact surface.
6. The assembly of claim 5, wherein said upper cross member defines a planar portion overhanging a front side of said frame support member.
- 10 7. The assembly of claim 2, wherein said side shift frame defines a planar front face, wherein said fork contact surface of said fork shoes is coplanar with said planar front face of said frame.
8. The assembly of claim 2, wherein the side shift operator means comprises a first piston and second piston, each of said pistons abutting against said side shift frame, said frame support member defining a first cavity and a second cavity, said first piston being slidably received in said first cavity and said second piston being slidably received in said second cavity, said first and second cavities being in fluid communication with a supply of hydraulic fluid, said first piston being adapted to slide said frame in one direction upon receiving an inflow of hydraulic fluid in said first cavity, and said second piston being adapted to slide the frame in an opposite direction upon receiving an inflow of hydraulic fluid in said second cavity.
- 15 9. The assembly of claim 8, wherein each of said pistons is sealed against each of said cavities by a gland nut.
- 25 10. The assembly of claim 8, further comprising first and second contact pads secured to said side shift frame, wherein said first piston abuts against said first contact pad and said second piston abuts against said second contact pad.

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11. The assembly of claim 8, wherein the fork positioner comprises:

a) a hydraulic cylinder connected to said side shift frame, said hydraulic cylinder defining first and second cylinder ports communicating with a supply of hydraulic fluid; and

5 b) a rod received in said hydraulic cylinder, said rod being adapted for reciprocating movement in said hydraulic cylinder, said rod having a free end secured to said first fork shoe, said rod being adapted to move said first fork shoe away from said hydraulic cylinder upon hydraulic fluid entering said first cylinder port, and move said first fork shoe toward said hydraulic  
10 cylinder upon hydraulic fluid entering said second cylinder port; and

c) a centering assembly adapted to move said second fork shoe upon movement of said first fork shoe, wherein said first and second fork shoes are maintained at an equal distance from the center of said side shift frame.

15 12. The assembly of claim 11, wherein said centering assembly comprises a chain loop movably connected to said frame, said first and second fork shoes being secured to said chain loop, wherein movement of said first fork shoe actuated by said rod moves said chain loop, thereby moving said second fork shoe equidistantly.

20 13. The assembly of claim 12, wherein said chain loop comprises an upper chain connected to a lower chain.

14. A side shift assembly for a lift truck having a mast and a pair of forks, said assembly comprising:

a) a carriage comprising a pair of horizontally spaced apart  
25 vertical members and a frame support member secured transversely to said vertical members, said vertical members being adapted to be movably secured within said mast, said frame support member defining a front face and an upper contact surface

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b) a side shift frame, said side shift frame comprising an upper cross member adapted to support said forks, said upper cross member defining:

- 5                   i)       a planar front portion covering said front face of said frame support member, and
- ii)       a lower contact surface adapted to engage said upper contact surface of said frame support member for sliding movement thereon; and

                  c) a side shift operator means for movement of said side shift  
10 frame along said frame support member, said shift means being located in a portion of said frame support member.

15.    The assembly of claim 14, wherein said upper contact surface has a convex shape and said lower contact surface has a concave shape, said upper contact surface being slidably received in said lower contact surface.

15 16.   The assembly of claim 15, wherein said side shift frame further comprises a lower cross member spaced apart from said upper cross member, said upper and lower cross members being substantially parallel, said upper and lower cross members being connected by spaced apart first and second side members to form a quadrilateral shape.

20 17.   The assembly of claim 16, wherein said side shift frame has a rectangular shape.

18.    The assembly of claim 16, wherein the shift means comprises a first piston and second piston, each of said pistons abutting against said side shift frame, said first piston being slidably received in a first cavity defined in said  
25 frame support member, said second piston being slidably received in a second cavity defined in said frame support member, said first and second cavities being in fluid communication with a supply of hydraulic fluid, said first piston being adapted to slide said frame in one direction upon receiving an inflow of hydraulic fluid in said first cavity, and said second piston being

adapted to slide the side shift frame in an opposite direction upon receiving an inflow of hydraulic fluid in said second cavity.

19. The assembly of claim 18, wherein each of said pistons is sealed against each of said cavities by a gland nut.

5 20. The assembly of claim 18, further comprising first and second contact pads secured to said upper cross member, wherein said first piston abuts against said first contact pad and said second piston abuts against said second contact pad.

21. A fork movement assembly for a lift truck having a mast and a pair of  
10 forks, each of said pair of forks having a hook portion located on a shank portion thereof, said assembly comprising:

a) a carriage comprising a pair of horizontally spaced apart vertical members and a frame support member secured transversely to said vertical members, said vertical members being adapted to be movably  
15 secured within said mast;

b) a side shift frame comprising an upper cross member, said upper cross member being slidably connected to said frame support member, said upper cross member being adapted to support said forks along said hook portion;

20 c) a shift means for movement of said side shift frame along said frame support member, said shift means being located in a portion of said frame support member;

d) a first fork shoe and a second fork shoe movably secured to said side shift frame, each of said fork shoes defining a fork contact surface  
25 adapted to engage said shank portion, said fork contact surface being located no further forward than a front face of said upper cross member; and

e) a fork positioning means for moving said first fork shoe relative to said second fork shoe, wherein said first and second fork shoes are maintained at an equal distance from the center of said side shift frame, said  
30 fork positioning means being operatively connected to said fork shoes.

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